

TITLE: NASA-NAVY TELEMEDICINE: AUTOGENIC FEEDBACK TRAINING EXERCISES FOR MOTION SICKNESS

CONTACT (NAME ONLY): Michael Acromite

AUTHORS (FIRST NAME, LAST NAME): Michael T. Acromite¹, Patricia Cowings², William Toscano², Carl Davis¹, Henry O. Porter¹

INSTITUTIONS (ALL): 1. Aviation Standards/Waivers, NAMI, Pensacola, FL, USA.
2. Human Systems Integration, NASA Ames Research Center, Moffett Field, CA, USA.

PRESENTATION TYPE: Panel Abstract

CATEGORY: Other Related Topics

ABSTRACT BODY:

Introduction: Seasickness is the most significant medical condition affecting naval aviation training. A 2001 study showed that seasickness was reported in 81% of naval aviation students and was associated with 82% of below average flight scores. The cost to a single training air-wing was over \$150,000 annually for fuel and maintenance costs alone. Resistant cases are sent to the Naval Aerospace Medical Institute (NAMI) for evaluation and desensitization in the self-paced seasickness desensitization (SPAD) program. This approach is 75% successful, but can take up to 8 weeks at a significant travel cost. NASA Ames Research Center's Autogenic Feedback Training Exercises (AFTE) uses physiological and biofeedback training for motion sickness prevention. It has a remote capability that has been used from Moffett Field, CA to Atlanta, GA. AFTE is administered in twelve (30-minute) training sessions. The success rate for the NASA AFTE program has been over 85%.

Methods: Implementation Phases: Phase I: Transfer NASA AFTE to NAMI; NASA will remotely train aviation students at NAMI.

Phase II: NAMI-centered AFTE application with NASA oversight. Phase III: NAMI-centered AFTE to remotely train at various Navy sites. Phase IV: NAMI to offer Tri-service application and examine research opportunities.

Results: 1. Use available telemedicine connectivity between NAMI and NASA. 2. Save over \$2,000 per student trained. 3. Reduce aviation training attrition. 4. Provide standardization of multi-location motion sickness training. 5. Future tri-service initiatives. 6. Data to NASA and Navy for QA and research opportunities.

Discussion: The NAMI SPAD program successfully treats 75% of motion sickness cases over six to eight weeks. The AFTE program shortens treatment to less than two weeks with a remote capability for wider application at reduced cost. AFTE has shown benefits for NASA Astronauts and Russian Cosmonauts with applicability to Naval Aviators. AFTE provides a telemedicine solution for the training delays and costs associated with motion sickness. The remote training increases availability, decreases cost and maintains central standardization of motion sickness treatment.

The NASA-Navy collaboration will result in operational benefits for both agencies with cost-savings through resource sharing and remote delivery.

Learning Objective 1: Telemedicine offers the opportunity for advanced technology transfer of AFTE for mutual benefit and enhanced performance with cost sharing opportunities.

Learning Objective 2: Telemedicine offers opportunities for remote AFTE application for rapid and wider availability with cost saving benefits.

Learning Objective 3: Telemedicine application of AFTE allows for central standardization and quality assurance of the application with opportunities for multi-agency application and collaborative research.

NASA-Navy Telemedicine Project:

‘AUTOGENIC FEEDBACK TRAINING TO IMPROVE MOTION SICKNESS’

Presented By:

CDR Michael Acromite
Naval Aerospace Medical Institute (NAMI)

NASA-Navy Telemedicine Project
‘AUTOGENIC FEEDBACK TRAINING TO IMPROVE MOTION SICKNESS’

- **Problem Definition**

- Motion sickness adversely affects Naval Aviation especially aviation training.
- A 2001 study showed that 81% of naval aviation students reported airsickness on one or more flights. In addition, 82% of below average flight scores were associated with motion sickness.
- Standard anti-motion sickness medications can cause unacceptable side-effects and are contraindicated in the operational setting.
- ~ 20-30 severe, resistant cases annually require a more thorough evaluation, and more aggressive physiological desensitization in the Self-Paced Airsickness Desensitization (SPAD) program.
- SPAD is successful in 75% of cases, but can take up to 8 weeks to complete.
- Unsuccessful SPAD results in mid-training attrition.
- Travel costs required for training at NAMI is prohibitive.

NASA-Navy Telemedicine Project
‘AUTOGENIC FEEDBACK TRAINING TO IMPROVE MOTION SICKNESS’

- Opportunities

- NASA AFTE expands and supplants the established and similar SPAD Program systems
- NASA hardware is currently available at NAMI for implementation.
- NASA and NAMI personnel are currently poised for trial and implementation.
- NAMI audio-visual connectivity with NASA for real-time interface established
- Initial training of NAMI personnel in AFTE applications is currently established while additional integrated training will be ongoing.

NASA-Navy Telemedicine Project
‘AUTOGENIC FEEDBACK TRAINING TO IMPROVE MOTION SICKNESS’

- **NASA-Navy Collaborative Support**
 - Utilize currently available NAMI audio-video teleconferencing (AVT) equipment and Internet connectivity to interface with NASA technologies.
 - System Administrative Support Requirements: Utilize established local support from the current SPAD program
 - Modification of NAMI SPAD Hardware for AFTE
 - NASA AFTE Specific Hardware
 - NAS AFTE technical specialists for the initial set up and ongoing support
 - NASA will provide ongoing remote support from program designers.

NASA-Navy Telemedicine Project
‘AUTOGENIC FEEDBACK TRAINING TO IMPROVE MOTION SICKNESS’

- **Implementation**

- Phase I: Technology & Training transfer for NASA to remotely train aviation students at NAMI using the AFTE program.
- Phase II: NAMI will use AFTE technology to train all aviation students with motion sickness at NAMI using AFTE.
- Phase III: NAMI will remotely train motion sickness prone students at multiple other Navy aviation sites.
- Phase IV: NAMI will offer to train Tri-Service aviation students remotely using AFTE and examine research opportunities.

NASA-Navy Telemedicine Project
‘AUTOGENIC FEEDBACK TRAINING TO IMPROVE MOTION SICKNESS’

- **Outcome Measures**
 - the percent of students who successfully complete aviation training following AFTE.
 - The time-to-complete AFTE

- **Return on Investment**
 - Financial benefits:
 - AFTE is estimated to save over \$2,000 per student trained, compared to the SPAD, based on per diem costs alone.
 - Non-financial benefits:
 - reduce training attrition
 - provide standardization of motion sickness training
 - Provide effectiveness and QA data to NASA and the Navy for advancement and subsequent research opportunities.
 - Future Tri-Service initiative

NASA-Navy Telemedicine Project
‘AUTOGENIC FEEDBACK TRAINING TO IMPROVE MOTION SICKNESS’

Funding: Navy Medicine Support Command

2 year money plus sustainment dollars to support phases I and II:

- Phase I: Technology & Training transfer for NASA to remotely train aviation students at NAMI using the AFTE program.
- Phase II: NAMI will use AFTE technology locally to train all aviation students with motion sickness at NAMI using AFTE with NASA oversight.
- Sustainment: Maintain technology and hardware to continue the successful application and investigate new and wider applications.

NASA-Navy Telemedicine Project
‘AUTOGENIC FEEDBACK TRAINING TO IMPROVE MOTION SICKNESS’

- **Conclusion**

- NASA Proven AFTE technology offers a more effective alternative to keep motion sickness susceptible aviators in the pipeline.
- Collaboration results in operational benefits for both agencies while realizing cost-savings through resource sharing and remote delivery of training.
- Remote application maintains central standardization and cost savings
- Remote application offers opportunities for wider and expanded applications
- The collaboration provides opportunities for additional AFTE research and training between NASA, Navy and other agencies.